

We Claim:

1. An electrode column for use in an arc furnace for the production of high-melting-point metals, comprising:

carbon electrodes having:

end faces; and

sockets having internal threads, said sockets being disposed at said end faces;

carbon nipples connecting two respective ones of said electrodes at said sockets;

said carbon electrodes and said carbon nipples having ideally formed contact surfaces with directionally structured, scale-shaped elevations protruding therefrom over a height range between approximately three micrometers and approximately one hundred micrometers; and

adjacent ones of said contact surfaces of a screwed together connection of said electrodes having a contact pressure in a range between approximately 0.1 N/mm^2 and approximately 80 N/mm^2 .

2. The column according to claim 1, wherein said ideally formed contact surfaces are one of planar and curved.

3. The column according to claim 1, wherein:

said carbon electrodes and carbon nipples are of a material;
and

said elevations on said directionally structured contact surfaces are of said material.

4. The column according to claim 1, wherein:

said screwed connection has a fastening direction and an loosening direction opposite said fastening direction;

said elevations have a substantially asymmetrical shape with flanks having a flank rise of differing steepness; and

said flanks have a substantially shallow rise in said fastening direction and have a substantially steep rise in said loosening direction.

5. The column according to claim 1, wherein:

said column electrodes are substantially cylindrical with a longitudinal axis; and

said elevations have a greatest height formed as one of a point and a substantially radially orientated comb relative to said longitudinal axis.

6. The column according to claim 1, wherein:

said column electrodes are substantially cylindrical with a longitudinal axis; and

said elevations have, relative to said longitudinal axis, a greatest height formed as one of a point and a substantially radially orientated comb.

7. The column according to claim 4, wherein each said shallow rise of all said elevations is disposed in said fastening direction in said contact surfaces.

8. The column according to claim 1, wherein said elevations are statistically distributed over a respective contact surface.

9. The column according to claim 1, wherein said elevations are disposed one of:

to partially cover a respective ideally formed contact surface; and

in at least one pattern.

10. The column according to claim 1, wherein a respective contact surface contain at least 100 meters of comb length of said elevations per square meter of said contact surface.

11. The column according to claim 1, wherein a respective contact surface contain at least 300 meters of comb length of said elevations per square meter of said contact surface.

12. The column according to claim 1, wherein:

said screwed connection has a fastening direction and an loosening direction opposite said fastening direction;

said carbon electrodes and said carbon nipples are elements of an electrode column; and

similar tangential directions selected from at least one of the group consisting of said fastening direction and said loosening direction of said directionally structured contact

surfaces of two adjacent ones of said elements are respectively aligned in opposite directions.

13. The column according to claim 1, wherein:

one of said carbon electrodes and one of said carbon nipples are combined to form a preset with inner contact surfaces;

said electrode socket and said nipple have threaded surfaces; and

said inner contact surfaces of said preset are directionally structured and include said threaded surfaces of said electrode socket and of said nipple.

14. The column according to claim 1, wherein said end faces, said sockets and said nipples have said contact surfaces with said elevations.

15. An electrode column for use in an arc furnace for the production of high-melting-point metals, comprising:

carbon electrodes each having:

end faces;

a socket with an internal thread on one of said end faces; and

an integrated nipple on another of said end faces;

said carbon electrodes having ideally formed contact surfaces with directionally structured, scale-shaped elevations protruding therefrom over a height range between approximately three micrometers and approximately one hundred micrometers; and

adjacent ones of said contact surfaces of a screwed together connection of said electrodes having a contact pressure in a range between approximately 0.1 N/mm^2 and approximately 80 N/mm^2 .

16. The column according to claim 15, wherein said ideally formed contact surfaces are one of planar and curved.

17. The column according to claim 15, wherein:

said carbon electrodes are of a material; and

said elevations on said directionally structured contact surfaces are of said material.

18. The column according to claim 15, wherein:

said screwed connection has a fastening direction and an loosening direction opposite said fastening direction;

said elevations have a substantially asymmetrical shape with flanks having a flank rise of differing steepness; and

said flanks have a substantially shallow rise in said fastening direction and have a substantially steep rise in said loosening direction.

19. The column according to claim 15, wherein:

said column electrodes are substantially cylindrical with a longitudinal axis; and

said elevations have a greatest height formed as one of a point and a substantially radially orientated comb relative to said longitudinal axis.

20. The column according to claim 15, wherein:

said column electrodes are substantially cylindrical with a longitudinal axis; and

said elevations have, relative to said longitudinal axis, a greatest height formed as one of a point and a substantially radially orientated comb.

21. The column according to claim 18, wherein each said shallow rise of all said elevations is disposed in said fastening direction in said contact surfaces.

22. The column according to claim 15, wherein said elevations are statistically distributed over a respective contact surface.

23. The column according to claim 15, wherein said elevations are disposed one of:

to partially cover a respective ideally formed contact surface; and

in at least one pattern.

24. The column according to claim 15, wherein a respective contact surface contain at least 100 meters of comb length of said elevations per square meter of said contact surface.

25. The column according to claim 15, wherein a respective contact surface contain at least 300 meters of comb length of said elevations per square meter of said contact surface.

26. The column according to claim 15, wherein:

said screwed connection has a fastening direction and an loosening direction opposite said fastening direction; and

similar tangential directions selected from at least one of the group consisting of said fastening direction and said loosening direction of said directionally structured contact surfaces of two adjacent ones of said carbon electrodes are respectively aligned in opposite directions.

27. The column according to claim 15, wherein:

one of said carbon electrodes forms a preset with inner contact surfaces;

said socket and said nipple have threaded surfaces; and

said inner contact surfaces of said preset are directionally structured and include said threaded surfaces of said socket and of said nipple.

28. The column according to claim 15, wherein said end faces, said socket, and said nipple have said contact surfaces with said elevations.

29. In an arc furnace for the production of high-melting-point metals, an electrode column comprising:

carbon electrodes having:

end faces; and

sockets having internal threads, said sockets being disposed at said end faces;

carbon nipples connecting two respective ones of said electrodes at said sockets; and

said carbon electrodes and said carbon nipples having ideally formed contact surfaces with directionally structured, scale-shaped elevations protruding therefrom over a height range between approximately three micrometers and approximately one hundred micrometers; and

adjacent ones of said contact surfaces of a screwed together connection of said electrodes having a contact pressure in a

range between approximately 0.1 N/mm^2 and approximately 80 N/mm^2 .

30. The column according to claim 29, wherein said end faces, said sockets and said nipples have said contact surfaces with said elevations.

31. In an arc furnace for the production of high-melting-point metals, an electrode column comprising:

carbon electrodes each having:

end faces;

a socket with an internal thread on one of said end faces; and

an integrated nipple on another of said end faces; and

said carbon electrodes having ideally formed contact surfaces with directionally structured, scale-shaped elevations protruding therefrom over a height range between approximately three micrometers and approximately one hundred micrometers

adjacent ones of said contact surfaces of a screwed together connection of said electrodes having a contact pressure in a

range between approximately 0.1 N/mm^2 and approximately 80 N/mm^2 .

32. The column according to claim 31, wherein said end faces, said socket and said nipple have said contact surfaces with said elevations.